

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1-2. (Canceled)

3. (Currently amended) A defect inspection method comprising the steps of:
applying a focused electron beam onto a sample and conducting scanning;
detecting secondary electrons generated from an inspection subject region of said
sample at the focused electron beam applying step by using detectors installed in a plurality of
directions, thereby obtaining external appearance images of the inspection subject region of said
sample picked up from the plurality of directions;
picking up images of a comparison subject region designed so as to originally
have an external appearance identical with that of the inspection subject region of said sample
from a plurality of directions identical with those of the inspection subject region, thereby
obtaining external appearance images of the comparison subject region picked up from the
plurality of directions;
correcting mis-registrations between the external appearance images of the
inspection subject region of said sample picked up from the plurality of directions and the
external appearance images of the comparison subject region picked up from the plurality of
directions that respectively correspond to the external appearance images of the inspection
subject region picked up from the plurality of directions; and
detecting defects of the inspection subject region by using the external appearance
images of the inspection subject region of said sample picked up from the plurality of directions
and the external appearance images of the comparison subject region picked up from the
plurality of directions corrected in mis-registrations~~The defect inspection method according to~~
~~claim 1,~~ wherein the step of correcting the mis-registrations comprises the substeps of:

22 mixing two perspective images obtained by picking up an image of the inspection
23 subject region of said sample from each of two opposed directions with a non-directional
24 electron image, thereby synthesizing a first mixed image;

25 mixing two perspective images obtained by picking up an image of the
26 comparison subject region of said sample from each of the two opposed directions with a non-
27 directional electron image, thereby synthesizing a second mixed image; and

28 comparing the first mixed image with the second mixed image, thereby obtaining
29 mis-registration quantities respectively between the two perspective images and the non-
30 directional electron image of the inspection subject region of said sample and the two perspective
31 images and the non-directional electron image of the comparison subject region.

1 4. (Original) The defect inspection method according to claim 3, wherein
2 the step of synthesizing the first mixed image comprises the substep of using
3 information of a difference image between two perspective images obtained by picking up an
4 image of the inspection subject region of said sample from each of two opposed directions, and
5 the step of synthesizing the second mixed image comprises the substep of using
6 information of a difference image between two perspective images obtained by picking up an
7 image of the comparison subject region from each of two opposed directions.

5. (Canceled)

1 6. (Currently amended) A defect inspection method comprising the steps of:
2 applying a focused electron beam onto a sample and conducting scanning;
3 detecting secondary electrons generated from an inspection subject region of said
4 sample at the focused electron beam applying step by using detectors installed in a plurality of
5 directions, thereby obtaining external appearance images of the inspection subject region of said
6 sample picked up from the plurality of directions;
7 picking up images of a comparison subject region designed so as to originally
8 have an external appearance identical with that of the inspection subject region of said sample
9 from a plurality of directions identical with those of the inspection subject region, thereby

10 obtaining external appearance images of the comparison subject region picked up from the
11 plurality of directions;

12 correcting mis-registrations between the external appearance images of the
13 inspection subject region of said sample picked up from the plurality of directions and the
14 external appearance images of the comparison subject region picked up from the plurality of
15 directions that respectively correspond to the external appearance images of the inspection
16 subject region picked up from the plurality of directions; and

17 detecting defects of the inspection subject region by using the external appearance
18 images of the inspection subject region of said sample picked up from the plurality of directions
19 and the external appearance images of the comparison subject region picked up from the
20 plurality of directions corrected in mis-registrations~~The defect inspection method according to~~
21 ~~claim 1~~, wherein the step of detecting defects of the inspection subject region comprises the
22 substeps of:

23 using information of a difference image and a sum image of two perspective
24 images obtained by picking up an image of the inspection subject region of said sample from
25 each of two opposed directions; and

26 using information of a difference image and a sum image of two perspective
27 images obtained by picking up an image of the comparison subject region from each of two
28 opposed directions.

1 7. (Currently amended) A defect inspection method comprising the steps of:
2 applying a focused electron beam onto a sample and conducting scanning;
3 detecting secondary electrons generated from an inspection subject region of said
4 sample at the focused electron beam applying step by using detectors installed in a plurality of
5 directions, thereby obtaining external appearance images of the inspection subject region of said
6 sample picked up from the plurality of directions;

7 picking up images of a comparison subject region designed so as to originally
8 have an external appearance identical with that of the inspection subject region of said sample
9 from a plurality of directions identical with those of the inspection subject region, thereby

10 obtaining external appearance images of the comparison subject region picked up from the
11 plurality of directions;

12 correcting mis-registrations between the external appearance images of the
13 inspection subject region of said sample picked up from the plurality of directions and the
14 external appearance images of the comparison subject region picked up from the plurality of
15 directions that respectively correspond to the external appearance images of the inspection
16 subject region picked up from the plurality of directions; and

17 detecting defects of the inspection subject region by using the external appearance
18 images of the inspection subject region of said sample picked up from the plurality of directions
19 and the external appearance images of the comparison subject region picked up from the
20 plurality of directions corrected in mis-registrations~~The defect inspection method according to~~
21 ~~claim 1~~, wherein the step of detecting defects of the inspection subject region comprises the
22 substeps of:

23 obtaining a difference image between a non-directional electron image obtained
24 by picking up an image of the inspection subject region of said sample and a non-directional
25 electron image obtained by picking up an image of the comparison subject region, by using local
26 perturbation; and

27 detecting defects of the inspection subject region by using information of the
28 difference image obtained by using the local perturbation.

1 8. (Currently amended) A defect inspection method according to claim
2 ~~[[1]]~~6, further comprising the step of classifying the detected defects by processing the defect
3 region.

1 9. (Original) A defect inspection method comprising the steps of:
2 applying a focused electron beam onto a sample and conducting two-dimensional
3 scanning on an inspection subject region;
4 detecting secondary electrons generated from an inspection subject region of said
5 sample at the focused electron beam applying step by using a plurality of detectors, thereby

6 obtaining a plurality of external appearance images of the inspection subject region of said
7 sample;

8 picking up images of a comparison subject region designed so as to originally
9 have an external appearance identical with that of the inspection subject region of said sample by
10 using said plurality of detectors, thereby obtaining a plurality of external appearance images of
11 the comparison subject region;

12 combining the plurality of external appearance images of the inspection subject
13 region of said sample to form a first synthetic image and combining the plurality of external
14 appearance images of the comparison subject region to form a second synthetic image;

15 obtaining a mis-registration quantity between the formed first synthetic image and
16 the formed second synthetic image;

17 correcting mis-registrations between the plurality of external appearance images
18 of the inspection subject region of said sample and the plurality of external appearance images of
19 the comparison subject region that respectively correspond to the plurality of external appearance
20 images of the inspection subject region, based on the obtained mis-registration quantity; and

21 detecting defects of the inspection subject region by using the plurality of external
22 appearance images of the inspection subject region of said sample and the plurality of external
23 appearance images of the comparison subject region corrected in the mis-registrations.

1 10. (Original) The defect inspection method according to claim 9, wherein at
2 the step of obtaining external appearance images of the inspection subject region of said sample,
3 the plurality of external appearance images of the inspection subject region of said
4 sample comprise two perspective images obtained by picking up an image of the inspection
5 subject region of said sample from each of two opposed directions, and a non-directional
6 electron image, and

7 the plurality of external appearance images of the comparison subject region
8 comprise two perspective images obtained by picking up an image of the comparison subject
9 region from each of two opposed directions, and a non-directional electron image.

11. (Original) The defect inspection method according to claim 9, wherein the step of correcting the mis-registrations comprises the substeps of:

mixing two perspective images obtained by picking up an image of the inspection subject region of said sample from each of two opposed directions with a non-directional electron image, thereby synthesizing a first mixed image;

mixing two perspective images obtained by picking up an image of the comparison subject region of said sample from each of the two opposed directions with a non-directional electron image, thereby synthesizing a second mixed image; and

comparing the first mixed image with the second mixed image, thereby obtaining mis-registration quantities respectively between the two perspective images and the non-directional electron image of the inspection subject region of said sample and the two perspective images and the non-directional electron image of the comparison subject region.

12-14. (Canceled)

15. (Currently amended) A defect inspection method comprising the steps of:
applying a focused electron beam onto a sample and conducting scanning;
picking up images of an inspection subject region of said sample from a plurality of directions, thereby obtaining a plurality of external appearance images of the inspection subject region;

picking up images of a comparison subject region designed so as to originally have an external appearance identical with that of the inspection subject region of said sample from a plurality of directions, thereby obtaining a plurality of external appearance images of the comparison subject region;

detecting defects of said sample by using the plurality of external appearance images of the inspection subject region and the plurality of external appearance images of the comparison subject region;

classifying the detected defects;

displaying the classified defects on a screen,

15 wherein the step of detecting said defects comprises the substeps of:
16 correcting mis-registrations between the plurality of external appearance images
17 of the inspection subject region and the plurality of external appearance images of the
18 comparison subject region; and
19 detecting defects by comparing the plurality of external appearance images of the
20 inspection subject region and the plurality of external appearance images of the comparison
21 subject region corrected in the mis-registrations~~The defect inspection method according to claim~~
22 14, wherein the step of correcting the mis-registrations comprises the substeps of:
23 mixing two perspective images obtained by picking up an image of the inspection
24 subject region of said sample from each of two opposed directions with a non-directional
25 electron image, thereby synthesizing a first mixed image;
26 mixing two perspective images obtained by picking up an image of the
27 comparison subject region of said sample from each of the two opposed directions with a non-
28 directional electron image, thereby synthesizing a second mixed image;
29 comparing the first mixed image with the second mixed image, thereby obtaining
30 mis-registration quantities respectively between the two perspective images and the non-
31 directional electron image of the inspection subject region of said sample and the two perspective
32 images and the non-directional electron image of the comparison subject region; and
33 correcting mis-registrations respectively between the two external appearance
34 images and the non-directional electron image of the inspection subject region of said sample
35 and the two external appearance images and the non-directional electron image of the
36 comparison subject region, based on the obtained mis-registration quantities.

16-17. (Canceled)

1 18. (Currently amended) A defect inspection method comprising the steps of:
2 picking up images of a first region of a sample from a plurality of directions,
3 thereby obtaining a plurality of external appearance images of the first region;
4 picking up images of a second region of said sample from a plurality of
5 directions, thereby obtaining a plurality of external appearance images of the second region;

6 correcting mis-registrations between the plurality of external appearance images
7 of the first region and the plurality of external appearance images of the second region;

8 detecting defects of said sample by using the plurality of external appearance
9 images of the first region and the plurality of external appearance images of the second region
10 corrected in the mis-registrations;

11 classifying the detected defects; and
12 storing information concerning the classified defects~~The defect inspection method~~
13 ~~according to claim 16~~, wherein the step of correcting the mis-registrations comprises the substeps
14 of:

15 mixing two perspective images obtained by picking up an image of the first
16 region of said sample from each of two opposed directions with the image obtained by picking
17 up an image from the different direction, thereby synthesizing a first mixed image;

18 mixing two perspective images obtained by picking up an image of the second
19 region of said sample from each of two opposed directions with the image obtained by picking
20 up an image from the different direction, thereby synthesizing a second mixed image;

21 comparing the first mixed image with the second mixed image, thereby obtaining
22 mis-registration quantities respectively between the two perspective images and the image
23 obtained by picking up an image from the different direction of the first region of said sample
24 and the two perspective images and the image obtained by picking up an image from the
25 different direction of the second region of said sample; and

26 correcting mis-registrations respectively between the two perspective images and
27 the image obtained by picking up an image from the different direction of the first region of said
28 sample and the two perspective images and the image obtained by picking up an image from the
29 different direction of the second region, based on the obtained mis-registration quantities.

1 19. (Currently amended) A defect inspection method comprising the steps of:
2 picking up images of a first region of a sample from a plurality of directions,
3 thereby obtaining a plurality of external appearance images of the first region;
4 picking up images of a second region of said sample from a plurality of
5 directions, thereby obtaining a plurality of external appearance images of the second region;
6 correcting mis-registrations between the plurality of external appearance images
7 of the first region and the plurality of external appearance images of the second region;
8 detecting defects of said sample by using the plurality of external appearance
9 images of the first region and the plurality of external appearance images of the second region
10 corrected in the mis-registrations;
11 classifying the detected defects; and
12 storing information concerning the classified defects.
13 ~~The defect inspection method~~
14 ~~according to claim 16,~~ wherein the step of detecting said defects uses,
15 information of a difference image ~~and information of a sum image~~ of two
16 perspective images obtained by picking up an image of the first region of said sample from each
17 information of a difference image ~~and information of a sum image~~ of two
18 perspective images obtained by picking up an image of the second region from each of two
19 opposed directions.

20-21. (Canceled)

1 22. (Currently amended) A defect inspection method comprising the steps of:
2 picking up images of a first region of a sample from a plurality of directions,
3 thereby obtaining a plurality of external appearance images of the first region;
4 picking up images of a second region of said sample from a plurality of
5 directions, thereby obtaining a plurality of external appearance images of the second region;

6 transmitting data of the plurality of external appearance images of the first region
7 of said sample and data of the plurality of external appearance images of the second region of
8 said sample;

9 detecting defects of said sample by using the transmitted plurality of external
10 appearance images of the first region of said sample and the transmitted plurality of external
11 appearance images of the second region of said sample; and

12 classifying the detected defects~~The defect inspection method according to claim~~
13 ~~21~~, wherein the step of detecting said defects uses,

14 information of a difference image ~~and information of a sum image~~ of two
15 perspective images obtained by picking up an image of the first region of said sample from each
16 of two opposed directions, and

17 information of a difference image ~~and information of a sum image~~ of two
18 perspective images obtained by picking up an image of the second region from each of two
19 opposed directions.

23. (Canceled)

1 24. (New) A defect inspection apparatus comprising:
2 electron beam irradiation unit for irradiating an inspection target with an
3 electronic beam focused thereon in a scanning manner;
4 a detection unit including a pair of narrow angle electron detectors and a non-
5 directional electron detector, the narrow angle electron detectors detecting in narrow angle
6 directions which are different from each other, electrons generated from the inspection target
7 which is irradiated with the electron beam focused by the electron beam irradiation unit;
8 an imaging unit for imaging a pair of detection signals detected by the pair of
9 narrow angle electron detectors of the detection unit to produce a pair of perspective images, and
10 for imaging a detection signal detected by the non-directional electron detector to produce a
11 secondary electron image; and
12 an image processing unit for processing respective images of a defect portion and
13 a reference portion of the inspection target which are imaged through the imaging unit by

14 detecting the defect portion and the reference portion through the detection unit so as to detect a
15 defect position of the inspection target;

16 wherein the image processing unit calculates a difference image of each of the
17 pair of perspective images of the respective defect and reference portions, and detects the defect
18 position of the inspection target from the calculated respective difference images between the
19 defect and reference portions.

1 25. (New) A defect inspection apparatus according to Claim 24 wherein the
2 image processing unit calculates a difference image concerning the calculated respective
3 difference images between the defect and reference portions, calculates a difference image
4 between the calculated difference image of the defect portion and the calculated difference image
5 of the reference portion, calculates a difference image of the secondary electron image between
6 the defect portion and the reference portion, and detects the defect position of the inspection
7 target from the calculated difference image between the defect portion and reference portion and
8 the calculated difference image of the secondary electron image between the defect portion and
9 the reference portion.

1 26. (New) A defect inspection apparatus comprising:
2 an electron beam irradiation unit for irradiating an inspection target with an
3 electronic beam focused thereon in a scanning manner;
4 a detection unit including a pair of narrow angle electron detectors and a non-
5 directional electron detector, the narrow angle electron detectors detecting in narrow angle
6 directions which are different from each other, electrons generated from the inspection target
7 which is irradiated with the electron beam focused by the electron beam irradiation unit;
8 an imaging unit for imaging a pair of detection signals detected by the pair of
9 narrow angle electron detectors of the detection unit to produce a pair of perspective images, and
10 for imaging a detection signal detected by the non-directional electron detector to produce a
11 secondary image;
12 a three-dimensional shape image calculation unit for calculating from the pair of
13 perspective images and the secondary image which are imaged by the imaging unit, a three-

14 dimensional shape of a part or a whole region of these images to produce a three-dimensional
15 shape image; and
16 an image processing unit for processing the three-dimensional shape image of a
17 defect portion and a reference portion of the inspection target, which is produced from the three-
18 dimensional shape image calculation unit by detecting the defect portion and the reference
19 portion through the detection unit and by imaging the defect portion and the reference portion so
20 as to detect a defect position of the inspection target.